43. (Currently Amended) At least one of an imaging and raster-mode scanning apparatus, ~~having~~ comprising

a beam generator for generating an electron beam,

~~a scanner that deflects at least one of the~~ actuator means for moving said electron beam relative to a sample object so as to form a scanner ~~and scans an object~~,

a sample holder ~~acceptor~~ for holding said sample ~~accepting the~~ object, ~~and, optionally, a deflector that deflects the sample acceptor, and~~

~~a compensator that compensates for ambient influences that may degrade an imaging of the object, comprising:~~

an image acquirer ~~that acquires~~ for acquiring ~~at least one of at least one pixel~~ pixels of ~~an image of the~~ said sample object and optionally of a predetermined reference object, so as to produce image signals,

an image processor for processing said image signals, ~~that is connected downstream of the image acquirer,~~

an image display device,

an electrical filter ~~with~~ having a signal input and a calibration input,

at least one sensor that provides a first signal dependent on ~~the~~ ambient influences, ~~and at least one of an actuator and a control element, wherein~~ that might interfere with proper imaging,

~~the~~ said electrical filter ~~has~~ having a settable transfer characteristic that can be set by applying a second signal to ~~a~~ said calibration input of ~~the~~ said electrical filter so as to ~~effect the~~ calibrate said apparatus ~~into a calibrated state~~, wherein said ambient influences

detected by ~~the at least one~~ said sensor are compensated such that image degradations acquired by the image acquirer are greatly reduced or essentially compensated, and wherein ~~the~~ said first signal dependent on the ambient influences passes through ~~the~~ said electrical filter and ~~drives at least one of an internal~~ is combined with driving signals for said actuator means ~~and internal control elements~~ of the apparatus ~~to control the scanner or the sample acceptor~~ to compensate the ambient influences that ~~has~~ have an adverse effect on ~~at least one of the~~ imaging ~~and on an image display acquired by the image acquirer~~.

44. (Previously Presented) The apparatus according to claim 43, wherein the at least one sensor is adapted to detect at least one physical quantity outside the apparatus, and to output the first signal that depends on the ambient influences at the location of the at least one sensor.

45. (Previously Presented) The apparatus according to claim 44, wherein the at least one sensor comprises at least one pick-up for electromagnetic fields, magnetic fields, air vibrations and ground vibrations.

46. (Currently Amended) The apparatus according to claim 43, wherein said signal input of the electrical filter ~~comprises a signal input that~~ is connected to an output of ~~the~~ said image processor ~~that is connected upstream of the image acquirer for acquiring the at least one pixel of an object~~.

47. (Previously Presented) The apparatus according to claim 43, further comprising a calibrator that manually calibrates the filter.

48. (Currently Amended) The apparatus according to claim 43, ~~wherein the control elements are arranged in the image processing device~~ said electrical filter is a digital filter.

49. (Currently Amended) The apparatus according to claim 43, wherein an output of the image processor is connected to ~~a~~ said calibration input of the electrical filter.

50. (Currently Amended) The apparatus according to claim 43, wherein the second signal varies as a function of at least one of ~~scanning~~ said relative position of ~~the~~ said beam to said object and of time controlled by the scanner.

51. (Currently Amended) The apparatus according to claim 44, wherein the apparatus operates in a calibration mode and subsequently operates in an image mode, whereby, in the calibration mode, ambient influences that degrade the image are detected by comparison of the image of the ~~predetermined~~ reference object under ambient influences with ~~an~~ prestored undistorted image of ~~a real structure of~~ the reference object in the image processor, and

wherein the comparison results in a difference representing an ~~image defect being assigned to the~~ error signal which is said second signal ~~being formed and output to the calibration~~ for calibrating ~~input of the~~ said electrical filter ~~for~~ by setting ~~the~~ said transfer characteristic thereof, and

whereby ~~by~~ calibration of the electrical filter ambient influences that degrade the image are greatly reduced or essentially compensated for, and

whereby the image defects are compensated for by maintaining the calibration in the image mode~~, even in the event of a change in the ambient influences~~.

52. (Currently Amended) The apparatus according to claim ~~41~~ 51, wherein in the calibration mode:

said prestored undistorted image of the reference objecting being present as a prestored undistorted reference image signal, the ~~scanner~~ apparatus scans, under ambient

influences, a selected section of the reference object so as to obtain a distorted reference image signal,

the image processor compares ~~a stored~~ said prestored undistorted reference image signal ~~assigned to the reference object~~ with said distorted reference ~~an~~ image signal ~~of the reference object under ambient influences, the image signal having been obtained from the image acquirer~~,

~~whereby in the image processor a defect~~ so as to form said error signal ~~is formed which is assigned to the~~ from any difference resulting from ~~the~~ said comparison ~~between the stored signal and the image signal and which the image processor outputs to the electrical filter~~, and

wherein the apparatus stores, in a memory, data for generating the second signal for setting the transfer ~~parameters~~ characteristics of the electrical filter for the image mode.

53. (Currently Amended) The apparatus according to claim ~~51~~ 52, wherein in the image mode:

the ~~scanner~~ apparatus scans the sample object to be imaged, and

~~the apparatus,~~ taking ~~the~~ said data stored during the calibration mode as a basis, generates the second signal for defining the transfer ~~parameters~~ characteristics of the electrical filter ~~on said basis for compensation of the image defects during the scan~~.

54. (Previously Presented) The apparatus according to claim 44, wherein the apparatus is set up for automatically calibrating the electrical filter during an image mode.

55. (Currently Amended) The apparatus according to claim 54, wherein ~~the~~ said image acquirer is adapted to scan ~~the~~ said sample object to form successive image lines ~~be imaged~~ which define line centroids, or image centroids, and ~~the~~ said image processor is

set up for determining a temporal displacement of said line centroids of successive image lines ~~scanned within~~ across the ~~whole~~ image ~~by the image acquirer~~ and outputs to the electrical filter, the second signal as a function of this temporal displacement ~~to the electrical filter~~.

56. (Currently Amended) The apparatus according to claim 55, wherein the image processor is set up for determining a temporal displacement of ~~the~~ said image centroids of successive images scanned by the image acquirer and outputs the second signal as a function of this temporal displacement, as determined, to the electrical filter.

57. (Previously Presented) The apparatus according to claim 54, wherein the electrical filter is set up for carrying out a cross-correlation of the first signal and of the second signal.

58. (Previously Presented) The apparatus according to claim 43, wherein the apparatus is set up for reducing or compensating for the image degradation in two mutually orthogonal directions.

59. (Currently Amended) The apparatus according to claim ~~14~~ 43, wherein the apparatus comprises one of a scanning electron microscope, a force microscope, a surface roughness measuring instrument, an optical scanning microscope, a light microscope, a transmission electron microscope or a lithography installation.

60. (Currently Amended) The apparatus according to claim 59, wherein in the case of the electron microscope, ~~an~~ said actuator means comprises at least one of a deflector for deflecting an electron beam and a displacer that displaces ~~the~~ said sample object.

61. (Currently Amended) The apparatus according to claim 59, wherein in the case of the light microscope, ~~an~~ said actuator means comprises a deflector device for deflecting light or a displacer that displaces ~~a~~ said sample object.

62. (Currently Amended) ~~The apparatus according to claim 46, wherein the apparatus~~ ~~comprises~~ At least one of a light microscope or a transmission electron microscope, comprising ~~wherein~~

a camera system for displaying a sample object,

a sample holder for holding a sample object,

actuator means for moving said camera system relative to said sample object,

~~the~~ an image acquirer for acquiring pixels of said sample object and optionally of a predetermined reference object, so as to produce image signals,

~~and~~ an ~~the~~ image processor ~~functions as one of the at least one sensors, and wherein the image processor outputs the first signal as a function of the temporal displacement that is determined~~ for processing said image signals,

an image display device,

a digital electrical filter having a signal input and a calibration input, wherein said image processor, based on analysis of successive image signals, provides a first signal dependent on ambient influences that might interfere with proper imaging,

wherein said image acquirer and said image processor cooperate to provide a second signal dependent on ambient influences,

said electrical filter having a settable transfer characteristic that can be set by applying said second signal to said calibration input of the electrical filter to effect the apparatus into a calibrated state, wherein said ambient influences are compensated such that image degradations acquired by the image acquirer are greatly reduced or essentially compensated, and wherein said first signal dependent on the ambient influences passes through said electrical filter and is

combined with driving signals for said actuator means of the apparatus to compensate the ambient influences that have an adverse effect on imaging.

63. (Currently Amended) A method for operating an imaging or raster-mode scanning apparatus for compensating ambient influences that may degrade the imaging, comprising the steps of:

providing a first signal dependent on the ambient influences,

supplying said first signal to a signal input of an electrical filter having a settable transfer characteristic which can be set by applying a second signal to a calibration input of the electrical filter, and

passing the first signal directly through ~~an~~ said electrical filter ~~with a settable transfer characteristic which can be set by applying a second signal to a calibration input of the electrical filter~~,

providing an output signal of the electrical filter,

providing a driving signal for an internal actuator or an internal control element of the apparatus and combining same with ~~the~~ said output signal of ~~the~~ said electrical filter, which has an effect on the imaging ~~or the image display~~ of an image processor ~~acquirer~~ of said imaging or raster-mode scanning apparatus, effecting the apparatus into a calibrated state, by applying said second signal to the calibration input of the electrical filter for setting the transfer characteristic, such that ~~the~~ any image degradation ~~acquired by the image acquirer~~ from ambient influences is greatly reduced or essentially compensated for.

64. (Previously Presented) The method according to claim 63, wherein the calibration of the apparatus is carried out by manual setting of the electrical filter.

65. (Currently Amended) The method according to claim 63, wherein ~~a~~ said internal control element ~~in the~~ is a member of said image processor ~~is driven and~~ for effecting the compensation of the image degradation ~~is carried out at least partially in the image processor~~.

66. (Currently Amended) The method according to claim 63, wherein ~~an~~ said internal actuator ~~in the scanner is driven~~ is a means for moving an electron beam relatively to a sample object so as to form a scanner and the compensation of the image degradation is carried out at least partially by driving ~~the~~ said internal actuator ~~of the scanner~~.

67. (Currently Amended) The method according to claim 63, wherein the apparatus is operated in a calibration mode and subsequently in an image mode, whereby ambient influences that degrade the imaging are detected by means of a sensor which is arranged outside the apparatus and drives a signal input of the electrical filter, whereby in the calibration mode, the degeneration of the image is greatly reduced or essentially compensated for by an imaging of a predetermined reference object under ambient influences and a comparison of the image of the reference object with ~~the~~ a prestored undistored image of the ~~real structure of the~~ reference object and by calibration of the transfer characteristic of the filter, and

in the image mode, the degradation of the image is at least partially compensated for by maintaining the calibration~~, even in the event of a change in the ambient influences~~.

68. (Currently Amended) The method according to claim 67, wherein the calibration mode comprises at least the following steps:

~~determination of~~ determining the first signal which depends on ~~the interfering~~ any ambient influence at the location of the sensor, by the sensor arranged outside the apparatus;

~~application of~~ applying the first signal to the signal input of ~~the~~ said electrical filter;

~~acquisition of~~ acquiring a selected section of the predetermined reference object ~~by the image acquirer~~ by ~~the~~ scanning of the reference object under ambient influence so as to produce an actual image signal of the selected section;

~~comparison~~ comparing the actual image signal of the ~~acquired~~ selected section of the reference object under ambient influences with a prestored undistorted image signal ~~the real structure~~ of the reference object~~; and~~ so as to form an error signal which is ~~determination of a defect signal assigned to~~ a difference between prestored undistorted image signal and actual image signal ~~which results from the comparison~~;

~~application of~~ applying the second signal, derived from ~~the defect~~ said error signal, to the ~~regulating~~ calibration input of ~~the~~ said electrical filter for ~~defining~~ setting the transfer characteristic of the electrical filter;

~~application of~~ applying the output signal of the electrical filter to the signal input of a regulating amplifier;

~~application of~~ applying the output signal of ~~the~~ said regulating amplifier to an actuator ~~or a control element to control an internal scanner for~~ which is for scanning a sample object or said reference object by deflecting a beam ~~or scanning an object~~ or by ~~for deflecting~~ moving a sample holder relative to said beam, said deflecting of said beam or said moving of said sample holder being influenced so as to correct imaging ~~acceptor that~~

~~accepts the object or reference object for the purpose of correcting the degraded image quality~~;

~~iterative calibration of the characteristic of the electrical filter, in such a way that the reduction of the imaging quality is greatly reduced or essentially compensated for, by means of the following steps~~ repeating the iterations of the steps of comparing said actual image signal and said prestored undistorted image signal so as to~~:~~

~~comparison of the corrected image of the reference object under ambient influence with the real structure of the reference object,~~

~~alteration of the~~ modify said characteristic of ~~the~~ said electrical filter for minimizing said error signal ~~in such a way that the corrected image approximates to the real structure of the reference object,~~

~~storage of~~ and storing data determined by iterative calibration for providing the transfer characteristic of the electrical filter for ~~the~~ said image mode.

69. (Currently Amended) The method according to claim ~~67~~ 68, wherein in the image mode, an image signal of ~~the~~ said object is acquired by scanning, ~~the~~ with said transfer characteristic of ~~the~~ said electrical filter ~~of the apparatus that has been determined~~ being fixed in ~~the~~ said calibration mode ~~being fixedly prescribed, and the~~ and wherein said output signal of ~~the~~ said electrical filter, ~~which is a digital filter,~~ after passing through a regulating amplifier, is ~~assigned~~ supplied to ~~the~~ an internal actuator or ~~the~~ control element which is a means for moving a beam relatively to said sample object in the manner of a scanner, with the result that the ambient influences that degrade the imaging of the sample object acquired by the scan are greatly reduced or essentially compensated for ~~even in the event of a change in the ambient influences~~.

70. (Currently Amended) The method according to claim 63, wherein

~~ambient influences which impair the imaging of the image acquirer are detected by means of the sensor, which is arranged outside the apparatus and drives the signal input of the electrical filter which is a digital filter, with the first signal,~~

~~the image acquirer feeds its acquired image signal to an~~ said image processor~~, in which~~ makes an image analysis of ~~the~~ an image of a sample object or a reference object acquired by ~~the~~ said imaging or raster-mode scanning apparatus and produces a setting signal ~~image acquirer is carried out and a signal dependent on the analysis is applied as the second signal~~ dependent on ~~the~~ such image analysis which is applied as ~~the~~ said second signal to ~~the~~ said calibration input of ~~the~~ said electrical filter~~,~~

~~the output of the electrical filter is applied via a regulating amplifier to the actuator or the control element of the apparatus, which has an effect on the image, the image degradation thereby being greatly reduced or essentially compensated for~~.

71. (Currently Amended) The method according to claim 70, wherein

~~an object to be imaged is scanned by the image acquirer,~~

the image analysis comprises a recursive determination of a temporal displacement of line centroids of successive image lines within the ~~whole~~ image of ~~the~~ said reference object~~,~~ ~~scanned by the image acquirer, whereby~~ and whereby

~~the~~ said second signal is calculated from ~~the~~ said temporal displacement.

72. (Currently Amended) The method according to claim 70, wherein

successive images of said reference object are taken, wherein the image analysis comprises a recursive determination of a temporal displacement of image centroids of said successive image ~~acquired by the image acquirer~~, and wherein

said ~~the~~ second signal is calculated from ~~the~~ said temporal displacement.

73. (Currently Amended) The method according to claim 71, wherein essentially a cross-correlation of the first signal with the second signal is carried out ~~in~~ and an output signal of the electrical filter ~~and, consequently, the actuator or the control element is fed with a drive signal~~ which is dependent on the cross-correlation between the first signal and the second signal is supplied to said actuator or control element.

74. (Currently Amended) The method according to claim 63, comprising the steps of

feeding ~~an~~ said image processor with an image signal ~~of the~~ from an image acquirer ~~acquired from the image~~;

analyzing the image signal in the image processor; ~~and~~

applying a signal dependent on the result ~~o the~~ of said analyzing step as ~~the~~ said first signal to ~~a~~ said signal input of the electrical filter; ~~and~~

~~applying a signal dependent on the result of the analyzing step as the first signal to a signal input of the filter; and~~

applying a signal dependent on the result of the analyzing step as the second signal to ~~a~~ said calibration ~~signal~~ input of the electrical filter; and

applying the output of the electrical filter via a regulating amplifier to ~~the~~ said internal actuator ~~via an~~ or said internal control element so as to reduce ~~of the apparatus, which has an effect on the imaging, the~~ imaging degradation ~~thereby being greatly reduced or essentially compensated for~~.

75. (Currently Amended) The method according to claim 74, wherein successive image lines within any image acquired and line centroids thereof or image centroids of successive image are determined, and wherein ~~the~~ said analyzing step ~~of the image acquired by the~~

~~image acquirer~~ comprises a recursive ~~determining~~ determination of ~~a~~ any displacement of said line centroids of said successive image lines within the ~~whole acquired~~ image or ~~the~~ a recursive determination of ~~the~~ any displacement of ~~the~~ said image centroids of successive images.

76. (Currently Amended) The method according to claim 63, wherein ~~the image degradation is essentially compensated for by means of the actuators or the~~ control elements acting in two mutually orthogonal directions are provided for compensating any image degradation.

77. Currently Amended) An apparatus for compensating for ambient influences in imaging or raster-mode scanning apparatuses that may degrade the imaging with an image acquisition and an image processing device producing an image of a sample object or a reference object, comprising

a calibratable digital electrical filter with a signal input and a calibration input;

a regulating amplifier which is electrically connected downstream of the electrical filter,

an internal control element controlled by the regulating amplifier;

wherein a first signal dependent on the ambient influences is applied to the signal input of the electrical filter which generates an output signal at the output of the electrical filter, and

wherein a second signal is applied to the calibration input of the electrical filter to calibrate the electrical filter, and

wherein the internal~~ly controlled~~ control element has an effect on ~~the~~ said image ~~acquired~~ produced by ~~the~~ said image acquisition and ~~an~~ image ~~processor~~ processing device,

whereby in the calibrated state of the electrical filter, the image degradation is greatly reduced or essentially compensated for.

78. (Previously Presented) The apparatus according to claim 77, further comprising at least one sensor for detecting at least one physical quantity outside the apparatus, this sensor outputting the first signal which is dependent on the ambient influences at the location of the sensor.

79. (Currently Amended) The apparatus according to claim 49, wherein the apparatus is designed for operation in a calibration mode and for subsequent operation in an image mode, whereby, in the calibration mode, ambient influences which degrade the image are detected by the comparison of the image of ~~the predetermined~~ said reference object under ambient influences with ~~an~~ prestored undistorted image signal ~~of the real structure~~ of the reference object in the image processor,

wherein the comparison results in a difference representing an ~~image defect~~ error signal being assigned to the second signal ~~being formed and output to the calibration input of the electrical filter~~ for setting the transfer characteristic of said electrical filter,

whereby by calibration of the electrical filter, ambient influences which degrade the image are greatly reduced or essentially compensated for~~, and~~

~~whereby the image defects are compensated for by maintaining the calibration in the image mode, even in the event of a change in the ambient influences~~.

80. (Currently Amended) The apparatus according to claim 49, wherein the apparatus is set up for automatically calibrating the electrical filter ~~during the image mode~~.

81. (Currently Amended) The apparatus according to claim 49, ~~wherein the apparatus comprising~~ in the form of a light microscope or a transmission electron microscope also

comprising means for analyzing temporal displacement in said image signals, the first signal also being determined from ~~the~~ said temporal displacement ~~that is determined~~ in said image signals.

82. (Currently Amended) The apparatus according to claim 56, ~~comprising~~ in the form of a light microscope or a transmission electron microscope also comprising means for analyzing temporal displacement in said image signals, the first signal also being determined from the temporal displacement that is determined in said image signals.

83. (Currently Amended) The apparatus according to claim 46, for operation in a calibration mode and subsequently operable in an image mode, whereby, in the calibration mode, ambient influences which degrade the image are detected by the comparison of the image of ~~the~~ said optional ~~predetermined~~ reference object under ambient influences with ~~an~~ a prestored undistorted image signal ~~of the real structure~~ of the reference object in the image processor,

wherein the comparison results in a difference representing an ~~image defect~~ error signal being assigned to the second signal ~~being formed and output of the calibration input of the electrical filter~~ for setting the transfer characteristic of said electrical filter, ~~whereby by calibration of the electrical filter~~ so as to reduce ambient influences which might degrade imaging. ~~the image are greatly reduced or essentially compensated for, and whereby the image defects are compensated for by maintaining the calibration in the image mode,~~

~~even in the event of a change in the ambient influences.~~